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(54) A METHOD OF DECORATING CONFECTIONERY

(71) We, CADBURY LIMITED, a British Company of Bournville, Birmingham 30, do hereby declare the invention for which we pray that a Patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to methods of decorating confectionery by applying edible ink compositions thereto.

According to the present invention, there is provided a method of decorating an article of confectionery comprising the steps of (a) heating an edible ink composition which is solid at room temperature so as to liquify same (b) before, during or after the heating step, supplying the edible ink composition to a screen, (c) positioning an article of confectionery to be decorated adjacent the screen, (d) urging the heated and thereby liquified ink composition through the screen so as to apply the ink composition to the article of confectionery by means of a screen printing operation and (e) cooling or allowing the edible ink composition to cool and thereby solidify.

The above method differs from conventional screen printing processes in that a drying step is not essential because the ink composition chosen solidifies on cooling.

Preferably, the edible ink composition is heated before it is supplied to the screen.

Conveniently, the edible ink composition is fat based and is heated to a temperature of between 35°C and 45°C depending upon the fat chosen.

It is preferred to employ a screen having a mesh size of between 70 and 150 microns, most preferably approximately 120 microns.

The edible ink composition may comprise a sugar, milk solids, edible fat, and a permitted foodstuff colour, the edible fat being present in a quantity such that the composition is solid at room temperature but liquid at an elevated temperature. The solid components of the composition preferably have a size of not more than 60 microns and, furthermore, the viscosity of the composition is preferably not more than substantially 100 poise at 43°C, as measured on a Couette type viscometer at a shear rate of 3.0 sec⁻¹

The composition preferably contains a permitted agent for rendering the composition at least partially opaque.

By "permitted foodstuff colour" and "permitted agent" are meant a foodstuff colour and agent, respectively, which are permitted under the relevant Food and Drugs Regulations.

Articles of confectionery which can be decorated according to the method of the present invention may be biscuits, chocolate nougat, truffles, fudge, coconut ice, or caramel.

By the term "decorating" as used herein is meant not only applying the edible ink composition to produce a pleasing appearance to the article of confectionery so decorated, but it also includes applying the edible ink composition for information purposes, e.g. for identifying the nature or type of confectionery. The edible ink composition could be used to provide information on the confectionery for use in sales promotion competitions.

Examples of suitable, edible ink compositions for use in the method according to the present invention will now be described. Unless otherwise specified all percentages are by weight.

EXAMPLE 1

An edible ink composition for applying to moulded chocolate blocks contained in the following ingredients:—

White Candy coating	97%	85
Certolake Colour	2%	
Titanium dioxide	1%	

The white candy coating had the following composition:—

Sucrose	43.98%	90
Non-fat Milk Solids	23.48%	
Milk Fat	2.5%	
Lecithin (Cadbury-YN100)	0.81%	
Nucoa [®] "S" or Coberine [®] (synthetic fat)	29.23%	95
(Total fat)	32.54%	

(*Nucoa and Coberine are Registered Trade Marks.

The above ingredients were ground together in a pestle and mortar to a particle size of not more than 60 microns to produce a composition which had a viscosity of 100 poise at 43°C, as measured on a Couette-type viscometer at a shear rate of 3.0 sec⁻¹. The resultant ink composition was solid at room temperature.

EXAMPLE 2

- Example 1 was repeated using 96% of the white candy coating, 2% Certolake[®] colour, 1% titanium dioxide, 1% lecithin. The resultant ink composition was solid at room temperature and had a viscosity of 100 poise at 43°C as measured on a Couette-type viscometer at a shear rate of 3.0 sec⁻¹.

EXAMPLE 3

- A suitable, edible ink composition for applying to moulded chocolate blocks had the following composition:—

White Candy coating	94%
Certolake Colour	3%
Titanium dioxide	1%
Lecithin (Cadbury YN100)	2%

- The white candy coating had the composition as set out in Example 1 above.

- In this example of ink composition, the amount of foodstuff colour present was increased to give a deeper colour. In this case it was found necessary to increase the amount of emulsifier present in order to maintain the viscosity of not more than substantially 100 poise at a temperature of 43°C, as measured on a Couette type viscometer at a shear rate of 3.0 sec⁻¹. However, the ink composition was solid at room temperature.

- As in Example 1, the solids of the composition had a particle size of not more than 60 microns after grinding as described in Example 1.

- In Examples 1, 2 and 3, titanium dioxide was present as a whitening agent in order to produce a sufficiently opaque colour for the dark brown of the moulded chocolate blocks not to show through the ink composition. As an alternative to titanium dioxide, skimmed milk powder could have been used.

- An embodiment of a method of decorating articles of confectionery according to the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:—

- Figure 1 is a schematic plan view of one form of apparatus for carrying out the method.

- Figure 2 is a plan view of a printing head illustrated schematically in Figure 1, and

([®]Certolake is a Registered Trade Mark.)

Figure 3 is an elevation of the printing head of Figure 2.

Referring now to the drawings, the apparatus illustrated therein comprises a feed belt 60 which feeds, in a stepwise manner, chocolate blocks B from a moulding plant (not shown) to a printing station 61 whereat a screen printing head 62 is provided. At the printing station 61, four chocolate blocks B are printed simultaneously by the printing head 62, the blocks being correctly positioned when the leading block B abuts against an end stop 63 (Figure 1) and sensors (not shown) check the presence of four blocks B. The screen printing head 62 comprises (see especially Figure 2 and 3) a screen 64 disposed above the belt 60, and a spreader blade assembly 65 which is mounted for reciprocating movement relative to the screen 64 on the spindle 66 and the guide 67, the assembly 65 being provided with bushes 68 engaging spindle 66 and a ball race 69 engaging the guide 67. The assembly 65 includes a support plate 70 to which the bushes 68 and ball race 69 are connected, a shaft 71 journaled on the plate 70, and a spreader blade 72 attached to the shaft 71. A lever 73 secured to the shaft 71 extends through a slot 74 in plate 70 and is secured to a piston and cylinder device (not shown). In use, the piston and cylinder device reciprocates the assembly 65 and simultaneously pivots the shaft 71 relative to plate 70 to effect a screen printing operation, the lower edge of blade 72 engaging the upper surface of screen 64. The printing head 62 is mounted on a support plate 75 carrying a back-up plate 76 which is disposed under belt 60 (not shown in Figures 2 and 3). At the end of the printing operation, the four chocolate blocks B are moved in a direction perpendicular to the direction of movement of feed belt 60 by means of a piston and cylinder device 78 until they lie opposite a further belt 79 leading to a wrapping machine (not shown). The belt 60 conveys the printed blocks B onto the belt 79 for removal from the printing apparatus for wrapping. Simultaneously, a further four chocolate blocks B are moved under the printing head 61 to be subjected to a printing operation. Before reaching the wrapping machine, the coated ink composition has, or is, cooled sufficiently to solidify.

The viscosity values in this Specification are as measured on a Couette-type Viscometer. However, the candy based ink compositions described above are thixotropic and as such, it is very difficult to determine precisely their viscosity characteristics. Where, for example, less colour is required in the ink, the viscosity is lower and typically within the following range:— (Viscosity measurements are given at 43°C at different shear rates as measured on a Couette type Viscometer):—

EXAMPLE A

99% White candy coating
0.5% Titanium dioxide
0.5% Tartrazine Lake

5	Shear Rate (Sec ⁻¹)	Apparent Viscosity	
		1	2
	3.0	100.6	105.2
	6.0	70.9	77.8
	9.1	67.1	65.6
10	12.1	62.9	58.3
	15.1	58.6	58.6
	18.1	56.4	54.1
	21.1	56.2	53.0
	24.2	54.9	53.2
15	27.2	54.4	52.4
	30.2	53.1	

EXAMPLE B

The following viscosity readings were taken of an ink composition having a high viscosity, in this case where a larger amount of colour is required. For example, milk or plain chocolate units requiring bright colours for effect. Normally, however, the viscosity would be reduced by the addition of a vegetable fat or an emulsifier such as lecithin.

96% White candy coating
0.5% Titanium dioxide
3.5% Tartrazine Lake

30	Shear rate (Sec ⁻¹)	Apparent Viscosity	
		Poise	
		1	2
	3.0	857.8	469.5
	6.0	551.1	304.4
	9.1	442.4	260.3
35	12.1	374.9	256.3
	15.1	275.1	

In the above Examples A and B, the apparent viscosity values in Column 1 were determined at increasing shear rates whilst those in Column 2 were determined at decreasing shear rates. Example B was the maximum viscosity which would probably be used. If any further addition of colour, titanium dioxide, or other solid particles is required then the viscosity would be reduced with vegetable fat such as Nucoa® "S" or an emulsifier, such as lecithin Cadbury YN-100).

An edible ink composition used in the method according to the invention does not need to be dried as it sets upon cooling.

WHAT WE CLAIM IS:—

1. A method of decorating an article of confectionery, comprising the steps of (a) heating an edible ink composition which is solid at room temperature so as to liquify same, (b) before, during or after the heating

step, supplying the edible ink composition to a screen, (c) positioning an article of confectionery to be decorated adjacent the screen, (d) urging the heated and thereby liquified ink composition through the screen so as to apply the ink composition to the article of confectionery by means of a screen printing operation and (e) cooling or allowing the edible ink composition to cool and thereby solidify.

2. A method as claimed in claim 1, wherein the heating step is effected before the edible ink composition is supplied to the screen.

3. A method as claimed in claim 1 or 2, wherein the edible ink composition is fat-based and is heated to a temperature of between 35°C and 45°C depending upon the fat chosen.

4. A method as claimed in any preceding claim, wherein the edible ink composition comprises a sugar, milk solids, edible fat, and a permitted foodstuff colour, the edible fat being present in a quantity such that the composition is solid at room temperature but liquid at an elevated temperature.

5. A method as claimed in any preceding claim, wherein the composition includes a permitted agent for rendering the composition at least partially opaque.

6. A method as claimed in claim 5, wherein the permitted agent is a whitening agent.

7. A method as claimed in claim 6, wherein the permitted agent is titanium dioxide.

8. A method as claimed in claim 6, wherein the permitted agent is skimmed milk powder.

9. A method as claimed in any preceding claim wherein the edible ink composition includes an emulsifier.

10. A method as claimed in claim 9, wherein the emulsifier is lecithin.

11. A method as claimed in any preceding claim, wherein the edible ink composition has a viscosity of not more than substantially 100 poise at 43°C, as measured on a Couette-type viscometer at a shear rate of 3.0 sec⁻¹.

12. A method as claimed in any preceding claim, wherein solids components of the edible ink composition have a particle size of not more than 60 microns.

13. A method as claimed in claim 4 or in any of claims 5 to 12 when appended to claim 4, wherein the edible fat is a vegetable fat.

14. A method as claimed in claim 4 or 13, or in any one of claims 5 to 12 when appended to claim 4, wherein the permitted foodstuff colour is a dispersible lake.

15. A method as claimed in claim 4, 13 or 14, or in any one of claims 5 to 12 when appended in claim 4, wherein the permitted foodstuff colour is fat soluble.

16. A method as claimed in any preceding claim, wherein the screen has a mesh size of between 70 and 150 microns.

17. A method as claimed in claim 16,

wherein the screen has a mesh size of 120 microns.

18. A method of decorating an article of confectionery substantially as hereinbefore described with reference to the accompanying drawings.
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